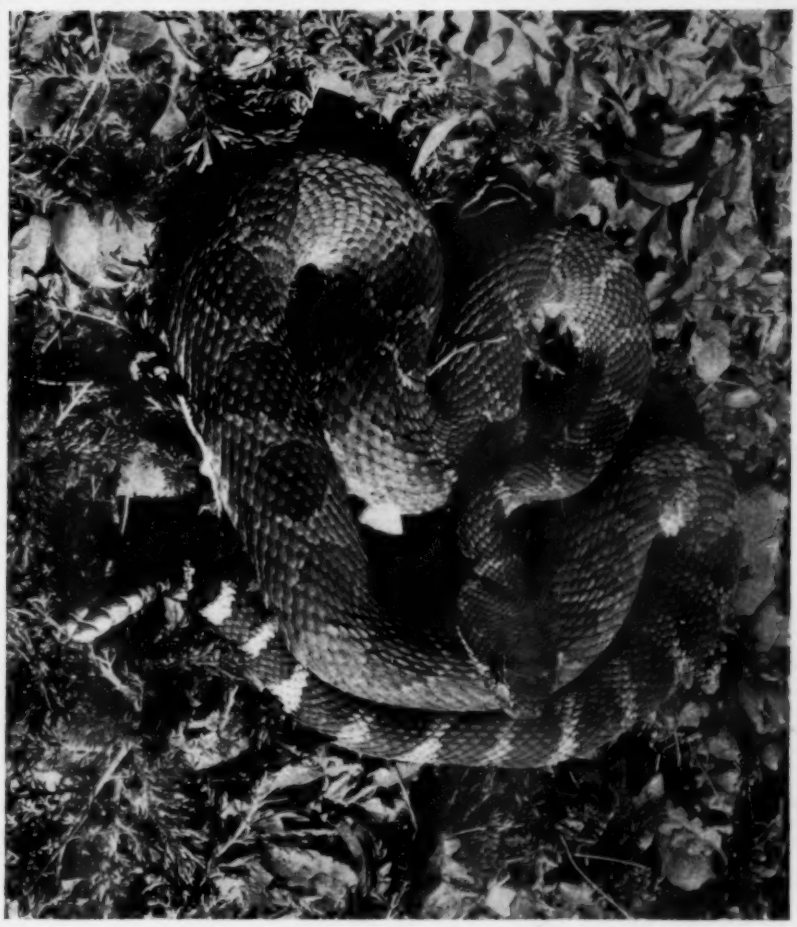
PRICE 15¢

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



FEBRUARY 28, 1931

Death Poses For His Portrait

See Page 138

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

Vol. XIX *No. 516*

The Weekly Summary of Current Science

Published by

SCIENCE SERVICE

The Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Edited by WATSON DAVIS

Subscription rates—$5.00 a year postpaid. 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Special reduced subscription rates are available to members of the American Association for the Advancement of Science.

In requesting change of address, please give old as well as new address.

Advertising rates furnished on application.

Publication Office, 1930 Clifton Ave., Baltimore, Md. Editorial and Executive Office, 21st and B Sts., N. W., Washington, D. C.

Address all communications to Washington, D. C. Cable address: Sciencerve, Washington.

Entered as second class matter October 1, 1926, at the postoffice at Baltimore, Md., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trade-mark, U. S. Patent Office.

DO YOU KNOW THAT

The tree ferns of the Hawaiian Islands sometimes reach a height of 40 feet.

Rats, moving from place to place, cause damage estimated to average $20 per year to each farm in New Hampshire.

Fifteen dyes are certified by the U. S. Department of Agriculture for use in candy, ice cream, soft drinks, and other foods.

Large flocks of wild pigeons are reported to have left Yosemite Valley, California, because of the shortage of acorns there.

Chemists at the New York State Experiment Station at Geneva have found a new method for clarifying fresh apple juice, so that it can be pasteurized and bottled within 24 hours after it is pressed.

The fossil bones that represent *Pithecanthropus erectus*, generally regarded as the oldest known man, indicate to one scientist at least that this ancient individual was left-handed.

Persian attar of roses is distilled from the double pink rose.

The Hiawatha National Forest, recently established, brings the total of national forests up to 150.

A scientist states that the proportion of diamonds to the amount of rock mined is something like 1 to 700,000, and sometimes 1 to 4,000,000.

Giving children medicine in their food is not advisable, because of the possibilities of a bad psychological effect in regard to eating, is the advice of government home economics experts.

Remains of an extensive establishment of baths, dating from Roman days, are still in existence at the famous spa, Baden-Baden.

The Illinois State department of health has arranged to distribute bacteriophage, the tiny parasites which destroy certain germs, to physicians in the state, for use in three specific types of infection: boils and carbuncles, bladder infections, and typhoid.

WITH THE SCIENCES THIS WEEK

ARCHAEOLOGY
Counterfeiting Ancient Crime 136

ASTRONOMY
March Evening Skies 139
Observes Corona Without Eclipse 131

BOTANY
Contemporary Fossil 143

CONSERVATION
Elephant Hunting Expensive 136

DENDROLOGY
Offspring of Washington Elm 142

ENGINEERING
Runs 1200 Miles Without Refueling 135

ETHNOLOGY
Hengist and Horsa Today 137
Indians Sing for Science 137

GENERAL SCIENCE
First Glances at New Books 144

MARINE BIOLOGY
Copper Cures Roving Oysters 137

MEDICINE
Clinics Would Save Thousands 132
Only the Children See 142

MINING
Safety Reduces Coal Cost 132

PHYSICS
Kill Rats With Gamma Rays 135
New Precision Clock 143
Paper Tested By Baking 137

PHYSIOLOGY
Gland Disorders Make Problem Children 137
Rattlesnake Poison Immunizes 136

PSYCHIATRY
Forced Right Hand Use Harmful 136
Gland Disorders Make Problem Children 137

PUBLIC HEALTH
Aid for Crippled Children 138

SOLAR PHYSICS
Magnetism of the Sun 133

ZOOLOGY
Fish-Catching Spider 131
New Reptile House 138

ASTRONOMY

French Astronomer Observes Sun's Corona Without Eclipse

Photography Not Possible But Form May Be Traced When Observations Are Made in Clear Air on Mountains

A PROBLEM that has long engaged the attention of astronomers, that of observing the sun's corona without waiting for a rare total solar eclipse, has been partially solved by B. Lyot, an astronomer at the Meudon Observatory near Paris, France. He has reported to the Academy of Sciences how the form of the corona may be traced by the use of polarized light, provided the air is sufficiently clear. He made his observations from the 9,439-foot high summit of the Pic du Midi, which was the first mountain to be used by astronomers for an observatory. However, this method does not permit actual photographs of the corona. To obtain these, astronomers must still wait until the dark disc of the moon covers the sun.

Ordinary light is made of waves vibrating in many directions, but when polarized the vibrations are mainly in one particular direction. Light may be polarized artificially by the use of special prisms, but it sometimes occurs in nature when sunlight is reflected from a cloud of small particles. The corona consists largely of such particles, so its light is largely polarized, a fact that has often been verified at eclipses.

M. Lyot's apparatus consists principally of a very sensitive polarimeter, than can detect one part of polarized light in a thousand times as much ordinary light. With a telescope lens he obtained an image of the sun, and screened the bright inner part with a metal disc the same size as the image. The glare thus eliminated, he was able actually to see directly the solar prominences, great flames of hydrogen and other gases that shoot out from the sun's surface. These also were first observed at eclipses. For many years it has been possible to observe them at other times with the aid of a spectroscope, but this is probably the first time that they have been observed directly.

With the polarimeter set a little way from the edge of the sun, about a fifth of its diameter, no polarization of the light was observed, but as the instrument was moved inward it began, and increased as the edge was approached. M. Lyot believes he has shown conclusively that this is not due to any effect in the atmosphere, because very light clouds completely eliminated the effect. He made a series of observations by crossing the sun at different angles, and was thus able to plot the outline of the corona in all directions. As photographs of the corona at eclipse time often show streamers extending many times the diameter of the sun, he has probably only recorded the inner corona, which is much brighter than the outer portions. Therefore, astronomers will still find it necessary to travel long distances to observe a total eclipse. As a full check on M. Lyot's researches, it will be desirable to observe the corona by his method at the same time that a total eclipse is being observed elsewhere. In commenting on his work, Dr. Henri Deslandres, director of the Paris Observatory, of which the institution at Meudon is a branch, suggests that it may be possible to photograph the corona without an eclipse with the assistance of the spectroscope from a suitably clear station.

The Pic du Midi, scene of M. Lyot's labors, was the first mountain observatory. Francois de Plantade, who was born at Montpellier in 1670, and was a colleague of the great French astronomer, G. D. Cassini, was the first to propose an observatory on the Pic du Midi in order to take advantage of the clear sky. He made several ascents to study conditions and died there in 1741 while making such observations. His work was the forerunner of the modern American observatories in California on Mt. Wilson and Mt. Hamilton.

Dr. George Ellery Hale, honorary director of the Mt. Wilson Observatory, in 1893 made some of the first attempts to photograph the corona from a mountain top without waiting for an eclipse. These experiments were made from Pike's Peak, but were unsuccessful. It has been tried again in recent years, notably by Dr. W. H. Steavenson, a famous English astronomer, who conducted experiments in Switzerland in 1927, but these also were inconclusive. M. Lyot's method is based on a different principle from these, however, and it will be of great value if its accuracy is confirmed.

Science News Letter, February 28, 1931

ZOOLOGY

Fish-Catching Spider Found In Georgia

A FISH-CATCHING spider from Georgia is reported by Dr. E. W. Gudger of the American Museum of Natural History. It was captured by E. A. Fuchs of Atlanta, who found it in the act of dragging a violently resisting little minnow up on a leaf floating on the water. Dr. Gudger gives full details of this fish-eating spider, together with records of a number of similar cases, in the current issue of *Natural History*.

Science News Letter, February 28, 1931

WALK INTO MY PARLOR?

The descent into Hell, according to Virgil, is easy. So is the way easy for heedless insects, into the deadly throat of the pitcher-plant's hollow leaf, on which Cornelia Clarke has caught a guileless fly making its first and fatal misstep. Below him is the zone of downward-pointing bristles, and below that the wax-smooth wall sheer to the water in the death-pit, whence no victim ever escapes. What becomes of the drowned and disintegrating insects in the pitcher-plant's leaves? It used to be taken for granted that they were digested and absorbed by the plant; later testimony has not been so unequivocal.

MEDICINE

Mental Hygiene Centers Would Save Thousands of Dollars

Community Clinics Prevent Mental and Nervous Breakdown; Physicians Discuss Requisites of Medical Education

THOUSANDS of dollars can be saved to the state by developing its mental hospitals into mental hygiene centers for their communities, Dr. James Allen Jackson, superintendent of the Danville State Hospital, Danville, Pa., told the mental hygiene session of the congress on medical education and hospitals held at Chicago last week under the auspices of the American Medical Association.

Community clinics and educational efforts in connection with the hospital will help many persons adjust to their environment and prevent the development of many cases of mental and nervous breakdowns and diseases.

At the Pennsylvania hospital ten such clinics, established in the last ten years, have received 10,000 visitors, of which about half were new cases. Of these about two-thirds were children under sixteen. These children were so handled that less than one-fifth of them had to be committed to correctional institutions. The mental hospital in the rural area is better adapted to this type of work than the urban hospital, Dr. Jackson said.

Mental hygiene is a community job, agreed Dr. George S. Stevenson of the National Committee for Mental Hygiene. He pointed out that prevention of mental disorders differs from prevention of physical disease. Not only medicine, but criminology, pedagogy, social service and religion are concerned in the prevention of the mental ailments.

Medical education takes too much time, declared Dr. William J. Mayo, of the Mayo Clinic at Rochester, Minn., in an address at the same congress.

The long period of from two to four years in university or college before beginning the medical course dulls the young student's mind and makes the young physician almost 30 years old before he begins to practice, Dr. Mayo said.

A possible remedy for the situation lies in the four-quarter system which would save two or more years.

"Why should these young people at the strongest period of life continue in the educational system of the grammar school?" he asked.

Dr. Mayo questioned the wisdom of the prevalent system of examinations.

"Unconsciously the instructor uses the degree as a club to compel the student to remember by a cramming process rather than an understanding of the subjects taught," he said.

Dr. Mayo advised earlier contact with patients; more sympathetic understanding of the emotional suffering of patients; and a period of general practice before entering a special field of medicine.

Scientific research is valuable even if it does not produce great results, he said, because it stimulates the student's imagination and his interest in his special subject.

Medical students must be equipped with brains and a knowledge of mathematics and English, Dr. Wilburt C. Davison, dean of Duke University School of Medicine, Durham, N. C., declared.

Besides these essentials he advised greater premedical training in physics and chemistry. The matter of brains can best be judged by personal interview, he said. Academic records alone, no matter how excellent, are no longer the sole basis for admission to medical school. Dr. Davidson doubts the necessity for four years of college work before entering medical school. Culture is more likely to be acquired during the early years in the home than from four years at college, he believes.

Science News Letter, February 28, 1931

MINING

Cost of Coal Is Reduced By Safety Measures in Mines

THE VAST majority of the accidents occurring in coal mines could be prevented without adding a penny to operating expenses, W. H. Forbes, assistant engineer at the U. S. Bureau of Mines Safety Station in Vincennes, Ind., is convinced from recent investigations.

Actually money is saved, through decreased compensation and the reduction of labor turnover in mines where as much importance is attached to a worker's disobedience to safety rules or orders as to his reporting late for work or leaving the job before quitting time.

Instances in which accidents have been materially reduced solely due to an emphasis on safety rules and individual responsibility are cited by Mr. Forbes in proof of his contention:

"A face boss in charge of a pillar section producing about 900 tons of coal daily, had 23 men injured, entailing a loss of 2,500 days during a 10-month period.

"This foreman was induced to attend, and became much interested in, a course of instruction in accident prevention conducted for the officials of this mine. He then operated the same pillar section, under exactly the same conditions, for the next 12-month period with only four lost-time accidents, entailing the loss of only 49 days. Subsequently, he has operated the same pillar section for 19 months without a lost-time accident.

"Other foremen at the same mine have records nearly equal to the one mentioned above."

In this mine, lost-time accidents were reduced from 120 in the fiscal year, 1928-29, to 40 lost-time accidents during the fiscal year, 1929-30, a reduction of 66 per cent. due to safety measures which did not cost a penny. Indeed, the safety program netted the company profits by reducing the compensation costs per ton of coal from $0.045 to $0.0069. Workers also profited by the reduced accident hazard, only 8.4 per cent. suffering injuries during the first half of 1930 as compared with 10.8 per cent. injured during the first half of 1928.

Science News Letter, February 28, 1931

SOLAR PHYSICS

Magnetism of the Sun

"A Classic of Science"

THE EARTH AND SUN AS MAGNETS. By Dr. George Ellery Hale. Address delivered at the semi-centennial of the National Academy of Sciences, at Washington, D. C., May, 1913. Published in the Annual Report of the Smithsonian Institution for 1913. Washington, 1914.

IN CERTAIN regions of the sun we have strong evidence of the existence of free electrons. This leads us to the question of solar magnetism and suggests a comparison of the very different conditions in the sun and earth. Much alike in chemical composition, these bodies differ principally in size, in density, and in temperature. The diameter of the sun is more than 100 times that of the earth, while its density is only one-quarter as great. But the most striking point of difference is the high temperature of the sun, which is much more than sufficient to vaporize all known substances. This means that no permanent magnetism, such as is exhibited by a steel magnet or a lodestone, can exist in the sun. For if we bring a steel magnet to a red heat it loses its magnetism and drops the iron bar which it previously supported. Hence, while some theories attribute terrestrial magnetism to the presence within the earth of permanent magnets, no such theory can apply to the sun. If magnetic phenomena are to be found there they must result from other causes.

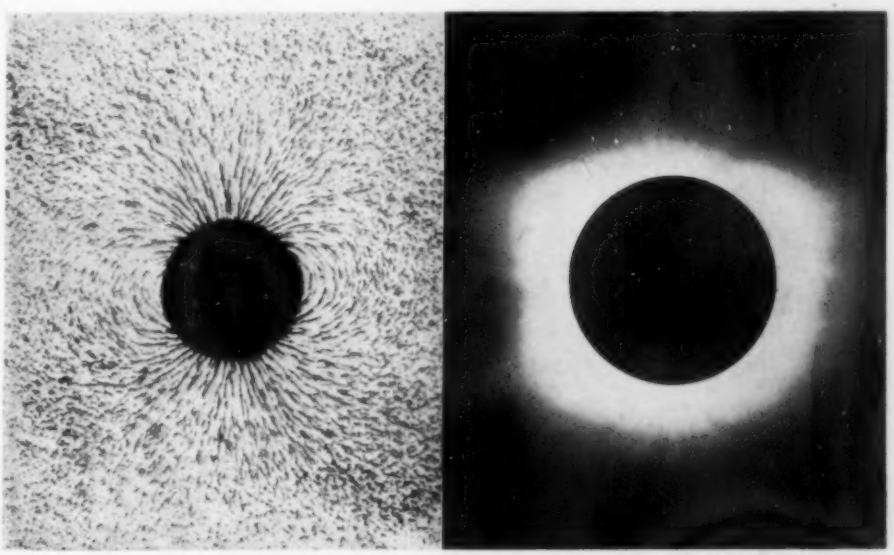
The familiar case of the helix illustrates how a magnetic field is produced by an electric current flowing through a coil of wire. But according to the modern theory, an electric current is a stream of electrons. Thus a stream of electrons in the sun should give rise to a magnetic field. If the electrons were whirled in a powerful vortex, resembling our tornadoes or waterspouts, the analogy with the wire helix would be exact, and the magnetic field might be sufficiently intense to be detected by spectroscopic observations.

A sun spot, as seen with a telescope or photographed in the ordinary way, does not appear to be a vortex. If we examine the solar atmosphere above and about the spots, we find extensive clouds of luminous calcium vapor, invisible to the eye, but easily photographed with the spectroheliograph by admitting no light to the sensitive plate except that radiated by calcium vapor. These calcium flocculi, like the cumulus clouds of the earth's atmosphere, exhibit no well-defined linear structure. But if we photograph the sun with the red light of hydrogen, we find a very different condition of affairs. In this higher region of the solar atmosphere, first photographed on Mount Wilson in 1908, cyclonic whirls, centering in sun spots, are clearly shown.

The idea that sun spots may be solar tornadoes, which was strongly suggested by such photographs, soon received striking confirmation. A great cloud of hydrogen, which had hung for several days on the edge of one of these vortex structures, was suddenly swept into the spot at a velocity of about 60 miles per second. More recently Slocum has photographed at the Yerkes Observatory a prominence at the edge of the sun, flowing into a spot with a somewhat lower velocity.

Thus we were led to the hypothesis that sun spots are closely analogous to tornadoes or waterspouts in the earth's atmosphere. If this were true, electrons caught and whirled in the spot vortex should produce a magnetic field. Fortunately, this could be put to a conclusive test through the well-known influence of magnetism on light discovered by Zeeman in 1896.

In Zeeman's experiment a flame containing sodium vapor was placed between the poles of a powerful electromagnet. The two yellow sodium lines, observed with a spectroscope of high dispersion, were seen to widen the instant a magnetic field was produced by passing a current through the coils of the magnet. It was subsequently found that most of the lines of the spectrum, which are single under ordinary conditions, are split into three components when the radiating source is in a sufficiently intense magnetic field. This is the case when the observation is made at right angles to the lines of force. When looking along the lines of force, the central line of such a triplet disappears, and the light of the two side components is found to be circularly polarized in opposite directions. With suitable polarizing apparatus, either component of such a line can be cut off at will, leaving the other unchanged.



Smithsonian Report, 1913—Hale Lick Observatory

POLAR STREAMERS OF THE SUN'S CORONA

Shown in the photograph on the right suggest the lines of force about a spherical magnet, made visible with iron filings in the picture on the left.

Furthermore, a double line having these characteristic properties can be produced only by a magnetic field. Thus it becomes a simple matter to detect a magnetic field at any distance by observing its effect on light emitted within the field. If a sun spot is an electric vortex, and the observer is supposed to look along the axis of the whirling vapor, which would correspond with the direction of the lines of force, he should find the spectrum lines double, and be able to cut off either component with the polarizing attachment of his spectroscope.

I applied this test to sun spots on Mount Wilson in June, 1908, with the 60-foot tower telescope, and at once found all of the characteristic features of the Zeeman effect. Most of the lines of the sun-spot spectrum are merely widened by the magnetic field, but others are split into separate components, which can be cut off at will by the observer. Moreover, the opportune formation of two large spots, which appeared on the spectroheliograph plates to be rotating in opposite directions, permitted a still more exacting experiment to be tried. In the laboratory, where the polarizing apparatus is so adjusted as to transmit one component of a line doubled by a magnetic field, this disappears and is replaced by the other component when the direction of the current is reversed. In other words, one component is visible alone when the observer looks toward the north pole of the magnet, while the other appears alone when he looks toward the south pole. If electrons of the same kind are rotating in opposite directions in two sun spot vortexes, the observer should be looking toward a north pole in one spot and toward a south pole in the other. Hence the opposite components of a magnetic double line should appear in two such spots. As our photographs show, the result of the test was in harmony with my anticipation. . . .

We thus have abundant evidence of the existence on the sun of local magnetic fields of great intensity—fields so extensive that the earth is small in comparison with many of them. But how may we account for the copious supply of electrons needed to generate the powerful currents required in such enormous electromagnets? Neutral molecules, postulated in theories of the earth's field, will not suffice. A marked preponderance of electrons of one sign is clearly indicated.

An interesting experiment, due to Harker, will help us here. Imagine a pair of carbon rods insulated within a furnace heated to a temperature of two or three thousand degrees. The outer ends of the rods projecting from the furnace are connected to a galvanometer. Harker found that when one of the carbon terminals within the furnace was cooler than the other a stream of negative electrons flowed toward it from the hotter electrode. Even at atmospheric pressure currents of several amperes were produced in this way.[1]

Our spectroscopic investigations, interpreted by laboratory experiments, are in harmony with those of Fowler in proving that sun spots are comparatively cool regions in the solar atmosphere. They are hot enough, it is true, to volatilize such refractory elements as titanium, but cool enough to permit the formation of certain compounds not found elsewhere in the sun. Hence, from Harker's experiment, we may expect a flow of negative electrons toward spots. These, caught and whirled in the vortex, would easily account for the observed magnetic fields.

The conditions existing in sun spots are thus without any close parallel among the natural phenomena of the earth. The sun-spot vortex is not unlike a terrestrial tornado, on a vast scale, but if the whirl of ions in a tornado produces a magnetic field, it is too feeble to be readily detected. Thus, while we have demonstrated the existence of solar magnetism, it is confined to limited areas. We must look further if we would throw new light on the theory of the magnetic properties of rotating bodies.

This leads us to the question with which we started: Is the sun a magnet like the earth? The structure of the corona, as revealed at total eclipses, points strongly in this direction. Remembering the lines of force of our magnetized steel sphere, we can not fail to be struck by their close resemblance to the polar streamers in the beautiful photographs of the corona. . . Bigelow, in 1889, investigated this coronal structure and showed that it is very similar to the lines of force of a spherical magnet. Stömer, guided by his own researches on the aurora, has calculated the trajectories of electrons moving out from the sun under the influence of a general magnetic field and compared these trajectories with the coronel streamers. The resemblance is apparently too close to be the result of chance. Finally, Deslandres has investigated the forms and motion of solar prominences, which he finds to behave as they would in a magnetic field of intensity about one-millionth that of the earth. We may thus infer the existence of a general solar magnetic field. But since the sign of the charge of the outflowing electrons is not certainly known, we can not determine the polarity of the sun in this way. Furthermore, our present uncertainty as to the proportion at different levels of positive and negative electrons and of the perturbations due to currents in the solar atmosphere must delay the most effective application of these methods, though they promise much future knowledge of the magnetic field at high levels in the solar atmosphere.

[1] King has recently found that the current decreases very rapidly as the pressure increases, but is still appreciable at a pressure of 20 atmospheres.

PHYSICS-BIOLOGY

Rats Used to Measure Danger From Penetrating Gamma Rays

RAT-KILLING with half a million dollars' worth of radium is the expensive-sounding sport which has claimed the attention of Dr. W. G. Whitman of the Johns Hopkins School of Medicine and her husband, Dr. M. A. Tuve of the Carnegie Institution of Washington.

Only it wasn't so expensive as it sounded, and it wasn't done for sport.

The experimenters still had their half-million dollars' worth of radium left at the end of their experiment. And they performed the experiment to get some idea of how dangerous it may be to work with the two-million-volt gamma ray tube which recently won for Dr. Tuve and his associates the thousand-dollar prize of the American Association for the Advancement of Science.

Dr. Whitman and Dr. Tuve exposed groups of rats to the hardest radiations given off by radium. These are the gamma rays, which are ether vibrations like X-rays, but much more penetrating, so that they will go through layers of metal and other substances that will stop X-rays. They are also more harmful to living tissue.

The two experimenters used six grams of radium, worth about $75,000 a gram. To cut off the "softer" radiations, they interposed layers of metal between the radium and the rats. They used, in various experiments, a millimeter of platinum, a millimeter of brass, sixteen millimeters of lead and five millimeters of celluloid.

When all of these filtering substances were in place, less radiation came through, but what did come consisted of the "hardest" gamma rays. When part of them were omitted, the "softer" rays came through in addition. Rats were tested with several different combinations of the filters, as well as with different masses of radium.

The rats all died when they were exposed to the less thickly shielded radium for six hours or longer. The longer the exposure the more severe the bodily injury. With shorter exposures the rats recovered from the direct bodily harm, but died after a time from progressive anemia. The delayed action of some of the harmful effects of the gamma rays indicated that blood-count observations alone are not a satisfactory protective measure for scientists working with high-voltage tubes.

Gamma rays have harmful effects on the reproductive cells as well as on the blood. For this reason experiments are going on to test the effects of the radiations in producing sterility and abnormal offspring. Abnormal young have so far appeared in the litter of only one of the females, but a number of the rats have been rendered sterile, the "sterility" dose of the rays being approximately the same as the exposure able to cause death.

Science News Letter, February 28, 1931

ENGINEERING

New Diesel Racer Will Run 1200 Miles Without Refueling

ADAPTATION of the Diesel engine to a racing car by C. L. Cummins and August S. Duesenberg has increased engineering interest in the 1931 Indianapolis Motor Speedway 500-mile race on Memorial day.

The new car is nearly twice as large as the conventional gasoline racer. It is thought to be the world's first Diesel-engined racing automobile and is said to carry sufficient power in crude oil to run nonstop at 100 miles an hour for 1,200 miles. This would give the new car the advantage of not having to stop to refuel, which is estimated to be the equivalent of a five mile start on the rest of the field.

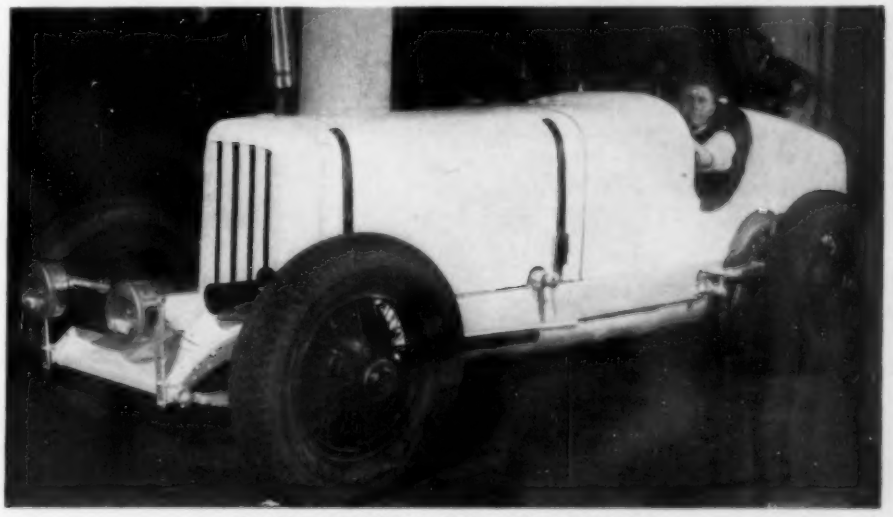
No ignition system is used in the new car, the heat of compression serving to fire the fuel. The fuel tank holds 47 gallons of crude oil and the radiator has a capacity of 42 quarts of water.

The car cost $15,000. It is 16½ feet long and nearly four feet high. It is four-cylindered with a piston displacement of 366 cubic inches.

Mileage is 40 miles to the gallon under ordinary driving conditions. At a speed of 100 miles an hour the mileage is about 25 miles to the gallon. When tested for speed at Datona Beach, Florida, the car made 100.772 miles per hour under A.A.A. timing.

Diesel engines offer advantages in strength and economy of fuel and consequently have been adapted to many uses in the past. This is thought to be the first time a Diesel engine has been tried in a racing car, however, though they have been used in airplanes.

Science News Letter, February 28, 1931



CONVENTIONAL IN APPEARANCE

Though somewhat oversize, this racer is anything but conventional in what is under the hood. Its Diesel engine could take it from New York to the middle of Iowa without stopping once to refill the fuel tank.

CONSERVATION

Elephant Hunting Is Expensive

THE SPORTSMAN with an appetite for the biggest of all big game, the African elephant, must now pay a pretty stiff fee for the privilege of shooting one. In Tanganyika territory the license for killing an elephant costs $250. In Uganda, between Lake Victoria and Lake Albert, the license costs considerably less: $50 for the first elephant, $100 for the second, and a limit of two elephants to any individual hunter in one year.

Under this licensing system, the yearly shoot may reach a mark as high as 225 animals. This may look formidable, but when offset against an estimated elephant population of 20,000 to 25,000 in these regions, it is believed that the interests of conservation are being reasonably served.

The sanctuaries for wild animals contain numerous elephants which seem to realize that they are quite safe there. Nevertheless in times of drought they frequently leave them to seek food and water elsewhere. If they turn to cultivated regions, they can in a short time cause great damage to crops, and measures must be undertaken to stop them.

It has been noticed that the elephant herds, when about to start on a raid, are generally preceded by old bulls who act as scouts and later lead the herd to the cultivated lands. Taking advantage of this peculiarity, the authorities instruct the official elephant hunters to attack these scouts and kill as many of them as possible. The result is that the herd, deprived of its leaders, abandons the raid, and later avoids a territory where losses were sustained.

Science News Letter, February 28, 1931

PSYCHIATRY

Forced Righthand Training Causes Mental Limp

CHANGING a normally lefthanded person into a righthanded one may cause a mental limp, Dr. Ira S. Wile of New York has discovered.

Just as an acquired physical limp may cause difficulty and fatigue because of the transfer of energy to unwonted muscles, so the transformation of lefthanded persons into righthanded ones produces an internal strain or mental limp. This psychic limp shows itself in behavior disorders of varying degrees, such as illegible writing, mirror writing, difficulty in reading, stuttering, school failure, truancy, lying and stealing.

Allowing the lefthanded to return to the use of his left hand, which is more natural and normal for him, usually clears up the behavior difficulty. Generally this is done without discussing behavior with the patient.

Besides allowing the patient to use his left hand again, he is encouraged to use his right eye by reading and studying with a patch over the left eye. The close connection of the eye and hand on the same side, and the fact that books are made for people whose right eyes, like their right hands, are dominant, makes it more difficult for naturally lefthanded persons to learn to read, Dr. Wile explained. This education of the right eye was sufficient to correct the behavior disorder in some children without reverting to lefthandedness.

The world happens to be geared for righthanded people, who are in the majority. The lefthanded child, however, should not be made to feel inferior, but should be given extra assistance in adjusting himself to a righthanded world. This does not necessarily mean that he must learn to use his right hand.

Science News Letter, February 28, 1931

PHYSIOLOGY

Rattlesnake Poison Immunizes Its Victims

RATTLESNAKE poison and how it acts has been the subject of a series of dramatic experiments by Dr. J. Marcowitz, Dr. H. E. Essex and Dr. F. C. Mann, of the Mayo Foundation. They found that animals that have recovered from rattlesnake poison are immune for several months thereafter. The immunity seems to reside in the blood fluid, rather than in the blood corpuscles; for blood corpuscles separated from the fluid will swell up when exposed to the venom, but if left in the fluid they are protected.

In the course of researches on the much-debated question of just what is the best rattlesnake-bite cure, Prof. Albert M. Reese, of the University of West Virginia, made the interesting discovery that rats are much more resistant to its action than are men.

Science News Letter, February 28, 1931

IN SCIENCE

ARCHAEOLOGY

Counterfeiting "Racket" In Germano-Roman Capital

COUNTERFEITING was a "good racket" in the estimation of the underworld of Imperial Rome. This is evidenced by a find in the outskirts of Trier, Germany, reported by Dr. Paul Steiner, director of the Provincial Museum of that city.

The find consists of a number of clay moulds of various Roman coins, dating from the period between 192 and 212 A.D. In two of them the counterfeit coins were still sticking.

The coins are known as false, partly because the moulds were found in an obscure corner on the edge of the city, instead of near its center where an authorized mint might naturally be expected. Furthermore, a chemical analysis disclosed the fact that the pieces are made not of silver but of a pale bronze containing a considerable mixture of lead.

Reviewing previous finds of counterfeiters' dens in Roman digs, Dr. Steiner remarks that the followers of this particular "racket" must have found it more profitable to operate in the provinces than in the capital. Not one such find has ever been made in Italy, he says, whereas counterfeit coin caches have been found in 26 places in France, 13 in Germany, three or more in Egypt and one each in Switzerland, Austria, Belgium and Tunis. Evidently the counterfeiters found "shoving the queer" an easier job among the less sophisticated frontiersmen; or possibly they may have victimized the ignorant barbarians of the lands outside the Empire.

Besides the unauthorized copies of good coin in base metal, Dr. Steiner states, there have been found many specimens of officially authorized coinage in cheaper alloys. These were "token coins," issued as modern paper money is issued, with the credit of the Empire behind them. Such representatives of gold coins were often made of gold-plated silver or bronze, and substitutes for silver coins were made of bronze plated with silver.

Science News Letter, February 28, 1931

NCE FIELDS

ETHNOLOGY

Hengist and Horsa Still On German Housetops

HENGIST and Horsa, mythical leaders and heroes of the Germanic tribes that invaded Britain after the withdrawal of the Romans, still have their monuments on the village housetops in the part of Germany that was the jump-off place for a goodly share of the Teutonic tribes.

The peasant houses in the villages of East Frisia, like those in many other parts of Germany, have the gable-beams run up and crossed above the rooftops, the projecting ends being carved into more or less realistic figures of horses' heads. Elsewhere in Germany this is simply a traditional practice and the wooden images have no special significance.

But in some of the villages of East Frisia they have personal names. They are called Hengst and Hors.

Science News Letter, February 28, 1931

PHYSIOLOGY-PSYCHIATRY

Gland Disorders Make "Problem Children"

EVIDENCE that disorders of the endocrine glands may be associated with behavior problems has been found by Dr. Allan W. Rowe, director of the Evans Memorial for Clinical Research and Preventive Medicine in Boston.

It is not possible to state now whether the glandular disorder is the cause of the behavior, Dr. Rowe said. But the two conditions occur together so often that some relation seemingly exists between them.

Dr. Rowe studied a group of 650 children, of whom 104 were reported, by physician or social worker or parent, to have shown disorder behavior. Of these 104, nearly two-thirds had some functional disorder of the endocrine glands. The pituitary gland was involved in 70 per cent. of the cases and the thyroid in most of the rest.

The remaining third of the behavior problem children had no glandular trouble, but suffered from various neurological disorders, principally injuries or disease of the brain and spinal cord or, in a few cases, from severe infection.

The one feature outside of the behavior problem which was common to all the children, was extensive evidence of marked disorders of metabolism.

Glandular treatment improved the behavior as well as the physical condition of some of the children suffering from glandular disorders. Dr. Rowe stated that this improvement in behavior might have been the result of the treatment or merely a coincidental improvement due to other, at present unknown, factors.

Science News Letter, February 28, 1931

MARINE BIOLOGY

Dose of Copper Makes Oysters Stop Roving

YOUNG oysters will not forsake a roving life and settle down to business until they have had a taste of copper.

This has been discovered through researches of H. F. Prythearch of the U. S. Bureau of Fisheries, who has been investigating the life history of oysters as a part of the government's drive to make oysters more abundant again.

When an oyster first hatches from the egg, it lives for a couple of weeks as a free-swimming larva, propelled through the water by the lashings of a multitude of hair-like processes, called cilia. This free-swimming period in their lives secures the wide distribution of the oyster young.

At about two weeks of age it is ripe to settle down. But it does not do so unless it receives its dose of copper. Lacking that, it continues to swim aimlessly about, becomes prematurely old and dies a prey to swarming microorganisms.

If it gets its few molecules of copper, its cilia cease to wave, and it settles to the bottom. There it protrudes its one foot, and proceeds to crawl laboriously about for a while. Finally it extrudes a little glue-like stuff, plants one of its two shells squarely in that, and thereafter is a fixed and solid citizen of the oyster commonwealth.

It takes very little copper to make an oyster larva quit swimming and adopt the sessile life of the adult form. One part of copper in fifty millions of water will turn the trick.

Science News Letter, February 28, 1931

ETHNOLOGY

Seminole Indians Sing For Scientific Record

SEMINOLE Indians of Florida, noted for their long-time policy of having as little as possible to do with white men, have at last sung some of their songs for scientific record. This is an unprecedented event in Seminole history. The songs were sung for Miss Frances Densmore, special collaborator for the Bureau of American Ethnology.

In a wire received by Science Service, from Miami, Miss Densmore said:

"I have today recorded two series of old Seminole songs. One series comprises songs of the green corn dance, the most important ceremony of the tribe. It is very old and is still held as thanksgiving for the ripening of the first corn each year. The songs were recorded in the Seminole village near here, by Charlie Billie, who is the leader of singing and dancing in this ceremony. The second series comprises songs for success in hunting.

"Very few Seminoles understand English, and they will not try to talk to white people. These Indians are independent and support themselves largely by hunting alligators and other animals in the Everglades and by selling hides. Their wants are few, as they live exactly like their ancestors. Native doctors treat the sick with remedies revealed in dreams. The Seminoles sing only in connection with ceremonies, music for them having a useful purpose in bringing about a desired end."

Science News Letter, February 28, 1931

PHYSICS

Newspaper Baked To Test Permanence

IF a piece of newsprint paper can pass the test of being baked for 72 hours at the boiling point of water, it is suitable for printing permanent library editions.

This test was devised by the Bureau of Standards of the U. S. Department of Commerce at the request of newspaper publishers. The results indicated that papers today can be printed to last if special paper, containing a minimum of impurities, is used.

After being subjected to the severe heat test, the recommended papers showed little loss in folding strength.

Science News Letter, February 28, 1931

ZOOLOGY

Electrically Heated Apartments For Toads and Snakes in Zoo

THE TOADS and snakes and other creeping and hopping inhabitants of the National Zoological Park at Washington, D. C., are moving into a new home with all the most modern comforts enjoyed by humans, including separate electrical heating of each apartment.

The new reptile house of the park, which will be thrown open to the public on Saturday, February 28, has a considerable number of its smaller glass-fronted cages individually warmed by automatically regulated electric heating units. Thus valuable but temperamental reptiles and amphibians that prefer a temperature of 70 degrees can have it, while in the next cage equally exacting creatures from the tropics can have 85 or 90 degrees if that will induce them to "look pretty" for the public.

Still other cages will be kept warm but arid, for the greater happiness of desert lizards and rattlers. The climatic preferences of a diamondback from Arizona are quite different from those of his zoological brother from Florida, and for purposes of ready comparison by zoo visitors the rattlesnake cages have all been arranged side by side.

In caring for the comfort of the animals on exhibition, the comfort of the crowds who will look at them has not been forgotten. The heating and ventilating system for the spectators' corridors is entirely separate from that of the cages. The visitor will be able to stand in the temperate zone and look through a window into the tropics.

Many rare reptiles have been collected for the exhibits, and more are on the way. Those now on hand include several species of the most deadly snakes in the world. There is a king cobra, largest of that very venomous family. With him is a spitting cobra, which jets its poison into the eyes of any person or animal that annoys him, causing great pain and temporary blindness. There are three extremely poisonous African snakes: the sand viper, the Gaboon viper and the rhinoceros viper.

As an interesting exhibit for visitors, and to safeguard the keepers who have to deal with the poisonous snakes, Dr. Mann has arranged to have on hand a complete collection of all the kinds of antivenin manufactured in the world. There is no way for the serpents to get at visitors, Dr. Mann explains, but in spite of all precautions an employee working behind the cages sometimes gets bitten.

For the visiting scientist, who may wish to spend days or weeks where the casual spectator spends only minutes, a research laboratory has been provided on the second floor of the building. Dr. Mann states that several applications from well-known zoologists have already been received.

Science News Letter, February 28, 1931

PUBLIC HEALTH

Seeks Federal Aid for Crippled Children

CRIPPLED children throughout the United States are entitled to especial attention and consideration at the hands of both state and federal governments, in the opinion of Senator Henry D. Hatfield of West Virginia.

Senator Hatfield, who is a physician, has introduced a bill of far reaching significance which would entitle states making special provision and appropriation for providing medical treatment and vocational training for cripples under twenty-one years of age, to an equal amount of money from the Federal Government.

The states at present are doing very little for crippled children, Senator Hatfield has discovered in compiling statistics on the subject. In 20 states, he says, neither state nor local government makes any appropriation for care and rehabilitation of cripples. In 34 states, there is a total of only $1,339,225 being appropriated for this purpose.

Senator Royal C. Copeland, of New York, who like Senator Hatfield is a physician with wide experience, states that there are in New York City alone some 35,000 cripples, and that throughout the country it is estimated there are 5,000 cripples to every million of population.

Senator Hatfield's bill would authorize the appropriation of two million dollars per year by the Federal Government the first year, to be increased each year until it reaches the sum of five million.

State agencies cooperating with the Federal Board for Vocational Education would carry out the provisions of the bill.

Science News Letter, February 28, 1931

ZOOLOGY

Camera Catches Rattler's Sinister Beauty

See Front Cover

PHOTOGRAPHING a rattlesnake is not the idea most of us would have of a healthy outdoor sport, especially when it is necessary to stand almost on top of the coiled and angry reptile to get a really good picture. But Walter E. Flowers of Spokane once let his picture-getting enthusiasm conquer his discretion—with the superb result shown on the cover of this issue of the SCIENCE NEWS LETTER.

Science News Letter, February 28, 1931

ASTRONOMY

The Evening Skies in March

By JAMES STOKLEY

WHAT is in some ways the most welcome astronomical event of the month of March comes on the morning of Saturday, the twenty-first, at seven minutes after nine, eastern standard time. The most careful watcher of the sky, looking through the largest telescope, would see nothing at this moment, but that is the time, according to astronomical convention, when the winter season comes to an end, and spring commences.

Because the axis of the earth is not perpendicular to the plane in which our planet revolves around the sun, but is inclined about 23½ degrees, the north pole sometimes leans towards the sun and sometimes away. The former brings summer, the latter, winter.

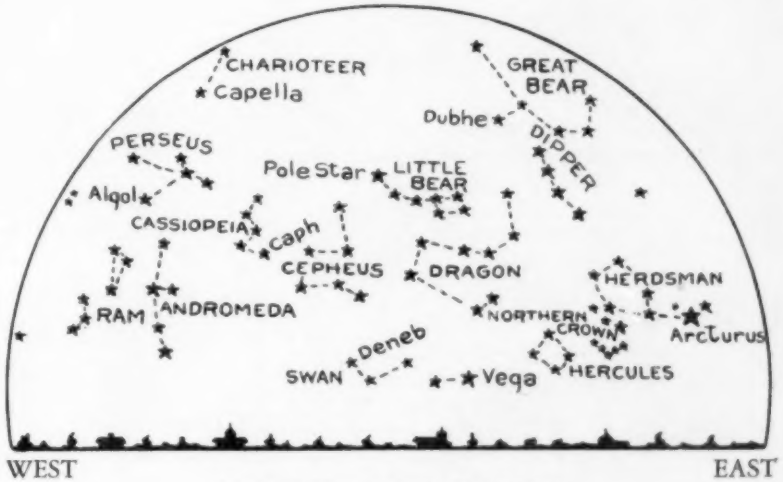
Another result is that the sun moves north and south through the sky. Its path through the sky, called the ecliptic, crosses the equator at a point called the vernal equinox, and it is this point that the sun reaches, this year, at 9:07 A. M., eastern standard time, on March 21. Because the sun is then on the equator, it rises directly east at six A. M. and sets directly west just twelve hours later. This makes the days and nights of equal length at this time; hence the name, "equinox."

If you watch the place and time of sunrise or sunset after the twenty-first, you will notice that sunrise comes a little earlier each day, and is a little farther to the northeast. Similarly, sunset is a little later, and more to the northwest. This will continue until the time of the summer solstice, on June 22, and after that, the sun will once more move southward through the sky.

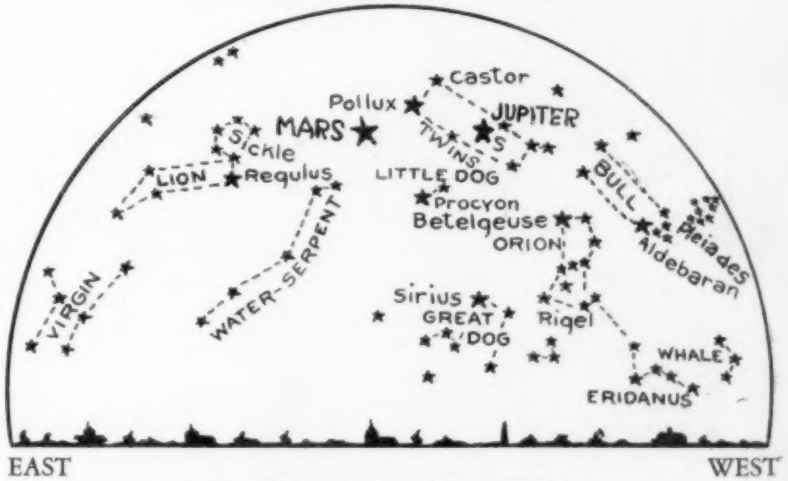
The normally excellent display of bright stars which March brings to the night heavens is supplemented now by two bright planets, Jupiter and Mars. Jupiter is the most brilliant object in the evening sky, with the exception of the moon, and is high overhead in the west. It is in the constellation of Gemini, the twins, marked by the stars Castor and Pollux. Pollux is the brighter of the pair, and is almost directly east of Jupiter. A little farther east, almost directly overhead, is the planet Mars. During the first part of the month Mars is brighter than Pollux, but it is diminishing in brilliance and at the end of the month its brightness will be between that of the two twins. But its steady, reddish light, different from that of the scintillating stars, makes it easy to identify.

The brightest of all the stars is Sirius, the dog star, in the group of Canis Major, the great dog. It is now in the southwest, and though inferior to Jupiter, its brightness makes it conspicuous. Above Sirius, a little more than half of the way to Mars, is another bright star, Procyon, marking Canis Minor, the little dog. To the right of Sirius, and below Jupiter, is the famous group of Orion. The three stars marking this warrior's belt are almost horizontal. Above them is the brilliant, reddish Betelgeuse, and below is Rigel. Somewhat fainter is Bellatrix, to the right of the belt. Still farther to the right is a star which for redness is even more conspicuous than Betelgeuse: Aldebaran, the eye of the bull, Taurus. To the northeast of Aldebaran is still another brilliant star, Capella, in Auriga, the charioteer.

For the other first magnitude stars of the March evening sky, you must look in the opposite direction. In the eastern sky, a little to the south, is Spica, in Virgo, the virgin. Above is the constellation of Leo, the lion, with the group of six stars forming the so-called



NORTHERN EVENING SKIES



SOUTHERN EVENING SKIES

"sickle" to represent the animal's head. At the end of the sickle's handle, pointing to the south, is the brilliant Regulus.

The planet Jupiter, conspicuous to the naked eye, is even more interesting through a telescope. Most prominent about the planet itself is the system of belts that cross its disc, like the conventional zones on a globe of the earth, made real on the planet. A small telescope, magnifying perhaps fifty times, is required to reveal these.

However, with a still smaller instrument, or even a good pair of binoculars, magnifying eight or ten times, you can see another Jovian feature, its moons. Jupiter has a total of nine satellites, and in this respect is second only to Saturn, which has ten. Five of Jupiter's moons are very faint, ranging between the thirteenth and nineteenth magnitudes, so that large instruments are required to reveal them. But the other four are much more easy to observe, three of them only a little too faint to be seen with the naked eye under the best conditions, that is, of the sixth and sixth and a half magnitude, and the fourth of the seventh magnitude. These are the moons that were discovered by Galileo.

In the summer of the year 1609 this great Italian, with whom modern astronomy really began, heard about a device in Holland that made distant objects appear close. Without receiving any exact description of the instrument, but from his own knowledge of optics, he proceeded to make a telescope, and first displayed it publicly on August 21. Then he made another, and another, gradually increasing in power. He turned these to the heavens and found that the moon was marked with mountains, and with dark areas that he supposed to be seas, and that stars were visible that he could not see with the naked eye. He also noticed that the stars appeared brighter, but no larger, with the telescope than they did with the unaided eye. By the time he came to his fourth glass, and turned it on the planets, he found that they appeared as little moons. That is, they no longer appeared as points of light, but as discs.

On January 7, 1610, came a momentous event. With his fifth telescope, better and more powerful than any of its predecessors, he studied the planet Jupiter. Close to it were three small, bright "stars," one to the west and two to the east. Galileo supposed that they were merely stars that happened to be in the same direction as Jupiter, yet he re-

marked that it was curious that they should all be in line with the planet. The next night he looked at Jupiter again, and was rather startled to find that the three "stars" were all on the west side, and closer together than on the previous night. Still he did not suppose them to be anything but stars, and concluded that the motion of Jupiter was different from what had been supposed, so that the motion of the planet itself had produced the effect.

It was cloudy the next night, so he could not observe, but on the tenth he was again able to look. Now there were only two "stars" and both were on the east! The third, he suspected, was behind the planet. By this time he felt sure that it was the motion of the "stars" and not of Jupiter, that caused the effect. The next night there were again two "stars," both on the east, but the outer of the two was much brighter than the other, although the two seen the previous night had been equal. Then he realized their true character. Here were three bodies that revolved around Jupiter just as the earth and the other planets revolve around the sun, or the moon around the earth.

On the night of the twelfth three again appeared, but one did not become visible until three o'clock in the morning, when it emerged from behind the eastern edge of Jupiter. Then the next night, he saw four "stars" and realized that there were four satellites, or moons, that revolved around Jupiter. The night of the fourteenth was cloudy, but after that, until March 2, he continued his nightly observations, and his original manuscript, recording these observations, together with the diagrams he made of the planet and the satellites, are preserved to this day in Florence, along with the lens of the telescope through which the discoveries were made.

In his magnificent poem, "The Watchers of the Sky," Alfred Noyes has beautifully described the discovery of the moons of Jupiter. Galileo's daughter, the nun Celeste, is speaking:

Late that night
My own dear lord and father came to me
And whispered, with a glory in his face
As one who has looked on things too beautiful
To breathe aloud, "Come out, Celeste, and see
A miracle."
I followed him. He showed me,
Looking along his outstretched hand, a star,
A point of light above our olive trees.
It was the star called Jupiter. And then
He bade me look again, but through his glass.
I feared to look at first, lest I should see
Some wonder never meant for mortal eyes.
He, too, had felt the same, not fear, but awe,
As if his hand were laid upon a veil
Between this world and heaven.
Then . . . I, too, saw,
Small as the smallest bead of mist that clings
To a spider's thread at dawn, the floating disc
Of what had been a star, a planet now,
And near it, with no disc that eyes could see,
Four needle-points of light, unseen before.
"The moons of Jupiter," he whispered low.
"I have watched them as they moved, from night to night;
A system like our own, although the world
Their fourfold lights and shadows make so strange
Must—as I think—be mightier than we dreamed,
A Titan planet."

These four moons that Galileo observed are often called, in his honor, the "Galilean satellites." They have also been given individual names, Io, Europa, Ganymede and Callisto. The latter two are probably about 3200 miles in diameter, but as Callisto is much darker than the others, it is the faintest of the four. Io is a little under 2500 miles in diameter, and Europa about 2000 miles.

The brighest three can be seen with a pair of eight-power binoculars with but little difficulty. The glass must be placed on a firm support, however, as the slightest trembling would make them invisible. A small telescope shows them easily, and through such an instrument you can watch their gyrations, just as Galileo did.

If you do, on the night of March 8 you will see something that would have been even more puzzling if Galileo had seen it on the first nights he observed the satellites. On the night of the eighth, not four, but one, will be visible for a time. At 9:19 P. M., eastern standard time, Io vanishes as it crosses the face of Jupiter. At 9:40 P. M., Europa disappears behind the planet, where it is followed by Ganymede at 10:40. This leaves only Callisto visible until 11:33, when Io reappears as it clears the western edge of the planet. At 2:01 A. M., Ganymede reappears, but by this time Jupiter will be low in the west, for observers in the eastern states, and will be hard to see. At 2:47 A. M., Europa again comes into view. Such a disappearance of all but one of the bright satellites, especially occurring during the evening hours when the phenomenon can be observed, is rather uncommon.

Our own moon, during March, is not entirely devoid of interest. On the night of March 4, or rather, early in the morning of March 5, it occults a fourth magnitude star, beta Virginis. This star is to the west of Spica, about a quarter of the way to the sickle of Leo. Though ordinarily it is easy to see a fourth magnitude star with the naked eye, it is somewhat more difficult when the full moon is close by, so this occultation can best be seen with a small telescope, or a pair of binoculars. At 2:25 A. M., eastern standard time, the star will disappear behind the eastern edge of the moon, to reappear from the western limb at 2:44. At this time, the moon is just past full, so it will be visible all night. On Wednesday, March 11, it is at last quarter, rising at midnight. It is new on the nineteenth, and at first quarter on the twenty-seventh.

Science News Letter, February 28, 1931

Some kinds of catfish swim on their backs.

Calves kept in a new two-story, steam-heated barn at Cornell University appear to be growing fast and are very healthy.

A coat of aluminum paint for the interior of ovens has been suggested by Cornell University to increase visibility within the oven.

In the winter of 1814, London had a fog which condensed upon the grass and trees with a coating like snow about half an inch thick.

DENDROLOGY

"Grand-Scion" of Famous Elm To Replace Fallen Ancestor

A TREE that is a true Son of the American Revolution stands on the campus of the University of Washington, ready to "go back East" whence its parent came, to take the place of a famous ancestor, now dead.

It is the offspring of the great Washington elm of Cambridge, Mass., under which General Washington stood when he assumed command of the Revolutionary army, then besieging the British in Boston. This great tree stood as a living patriotic monument until at last old age and disease overcame it in 1923.

But before the old elm died it had left offspring. In the current issue of *American Forests,* Heister Dean Guie tells the story of one of its lines of descent.

Thirty years ago, Arthur J. Collins, a graduate of the University of Washington, was studying at Harvard. Seeing that the Washington elm could not live much longer, he obtained the consent of the city officials of Cambridge to have cuttings made for later transplantation to the campus of his Pacific Coast alma mater.

Two of these scions, set out in the same hole thirty years ago, are now the pride of the University of Washington campus, and top the four-story building in front of which their twin trunks rise.

To obtain the "grand-scions" for replanting in place of the original Washington elm, boxes filled with earth and moss were clamped around two of the best limbs. The mass of soil induced the sprouting of roots. The limbs could then be sawed off and planted in the ground as independent trees. They now await word from Cambridge, when they will be shipped back to the city where their grandsire achieved immortality in the stirring days of 1775.

Science News Letter, February 28, 1931

MEDICINE

Mexican Villages Where None But Children See

STRANGE diseases, scarcely known to science, are found in certain parts of Mexico.

In Tiltepec and neighboring Indian villages of the isolated Sierra of Ixtlán in Oaxaca, where the entire population is in a state of extreme physical degeneracy, almost every inhabitant becomes blind or partly blind by the time he is 14 or 15 years old.

This condition was discovered by José Larumbe, now director of the Military Hospital at Mexico City, several years ago. It has later been investigated by the Swedish Dr. Weissman, who, however, advanced no definite theory as to its cause, except to point out the inadequacy of the diet of the natives and the unhygienic conditions under which they live.

The region produces a little corn, and the listless Indians raise some coffee which they exchange for cotton cloth and a few other necessities. They eat tortillas and atole of corn, and chili and coffee. The village of Tiltepec, the worst afflicted of the area, lies at the foot of a shallow cemetery on a hill regularly washed down by the heavy rains of summer.

According to some, the affliction is a deficiency disease due to lack of certain vitamins or other essential elements, while others believe it is due to some blood condition or infection from the sting of insects.

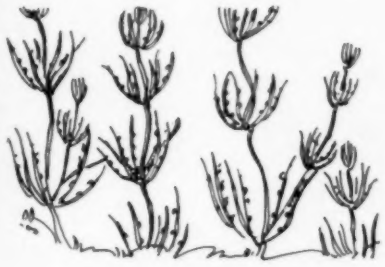
Science News Letter, February 28, 1931

BOXES OF MOSS AND EARTH
Clamped round the limbs of the Washington Elm's offspring, were used to induce the growth of roots. The limbs were then sawed off as "second generation" trees.

BOTANY

Nature Ramblings

By FRANK THONE



A Contemporary Fossil

IT IS still too early to go a-hunting wildflowers, although such things as pussy-willows, alder catkins and skunk cabbages are already about offering their humble satisfactions to the really thorough-going nature lover. But under the thawing waters there are plenty of plants, again humble members of the vegetational commonwealth, that will repay a little attention, even at the risk of a wet cuff.

In the ponds and slow creeks of regions rich in limestone you can find, even in the dead of winter, an attractive, wiry-stemmed, whorl-branched aquatic plant known to botanists as *Chara*. If you fish out a few stems of it and feel them with your fingers you will find that they are harsh to the touch.

Chara is usually classified as an alga, that is, as a relative of seaweeds and pond scums; though some botanists claim that it is a plant *per se*, an orphan of botanical evolution, having no living relatives. Certainly if it is an alga it is a most peculiar one, and those who regard it as such classify it as the highest of its division of the vegetable kingdom.

Whatever it may be in point of relationship, in point of time it is certainly one of the most ancient forms of life now extant. Rocks laid down in Cambrian times, which were simply uncountable millions of years ago, show fossils of *Chara* that can hardly be distinguished from its modern species. It is older than the cycads which the dinosaurs champed, older than the seed-ferns of the coal age. There were plants on earth before it, but they are dead and gone, and *Chara* still holds its own in the fresh waters all over the world.

Science News Letter, February 28, 1931

PHYSICS

New Clock Correct to 1-500 Second in 24 Hours

A NEW precision clock, which varies from correct time not more than one five-hundreth of a second in twenty-four hours, has been devised by Prof. Max Schuler of the University of Göttingen. It is described in detail in the German scientific journal *Die Umschau*.

The most distinctive feature about Prof. Schuler's clock is the addition of a very considerable mass of metal to the upper end of the pendulum, so arranged that its center of gravity is exactly opposite the knife-edge bearing on which the pendulum is suspended. This makes for great steadiness in its swing, and is the principal contributor to the clock's great accuracy.

In order to prevent changes in length of the pendulum as far as possible, the clock is kept in a room in which the temperature is regulated, and any changes that do occur are registered on automatic apparatus. To reduce atmospheric friction to a minimum, the clock is kept within a sealed glass case filled with hydrogen, which is the least viscous of gases.

The clock does not have a face and hands, like ordinary clocks. The function of telling the time is delegated to a second clock which it controls electrically, called a "slave clock." The free-swinging pendulum of this "master clock" does not even touch the electric contacts that drive the slave clock.

This is done by the most delicate and weightless of all possible levers, a beam of light. A lamp on one side of the master-clock case shines on a photo-electric cell on the other. Every time the pendulum swings, it causes a momentary eclipse of the photocell. This causes an electric current to flow for a moment, giving the slave clock the necessary little push to keep it going.

The slave clock, thus admonished to accuracy from second to second by its master, repays by closing a circuit with each swing of its pendulum, which supplies a momentary electromagnetic impulse to the master-clock pendulum, keeping it swinging.

Science News Letter, February 28, 1931

Good cheese can be made from frozen milk, with a slight modification of the cheese-making process, New York State dairy specialists have found.

• First Glances at New Books

Psychology

THE GUIDANCE OF MENTAL GROWTH IN INFANT AND CHILD—Arnold Gesell—*Macmillan,* 322 p., $2.25. Parents as well as those engaged professionally in child guidance will welcome this book. The changing attitude toward very young children is described in the first part of the volume as a background for the discussion of such practical problems as how to reduce children's fears and at the same time teach caution. One striking chapter is entirely pictorial, contrasting prints of child life in a past generation with photographs of modern babies.

Science News Letter, February 28, 1931

Archaeology-Art

PERUVIAN TEXTILES — Introduction by Joseph Breck; chronological chart of cultures by Philip Ainsworth Means—*Metropolitan Museum of Art,* 28 p., 24 pl., $1.50. This publication will appeal to two classes of readers. Students of design will find the plates of pre-Incan textiles and the accompanying descriptions of special interest. Archaeologists will hunt for the chronological chart of Peruvian civilization which Mr. Means publishes here for the first time. His survey of the cultures and their interrelationships is a most useful briefing of a complex subject. The textiles, representing Peruvian art style in different stages, are selected from the Metropolitan's collections.

Science News Letter, February 28, 1931

Paleontology

BRACHIOPODS FROM THE UPPER AND MIDDLE DEVONIAN OF THE TURKESTAN — D. Nalivkin — *Memories du Comité Géologique,* 180 (*Moscow*), 221 p., 10 pl. A bilingual (Russian and English) monograph of an important group of fossils from a hitherto little-known region.

Science News Letter, February 28, 1931

Archaeology-Ethnology

THE SARCOPHAGUS OF AN ANCIENT CIVILIZATION—George L. Robinson—*Macmillan,* 495 p., $7.50. Petra, the rose-red city that was carved out of sandstone cliffs, and the Edomites and the early Arabs who lived at the site in turn are the subjects of this distinguished volume. Professor Robinson's account is given in leisurely detail. Special chapters are devoted to different monumental remains, to the geology of the land of Edom, its botany, the modern inhabitants. Especially interesting are the chapters on different stages in the history of the Edomites, who traced their line from Esau. The importance of Edom is far greater than most men realize, Professor Robinson reminds us, adding "to obtain a true perspective of even Israel's history is impossible without some knowledge of Esau's national and religious life."

Science News Letter, February 28, 1931

Geography-Economics

THE COMING OF INDUSTRY TO THE SOUTH—*American Academy of Political and Social Science,* 296 p., $2 copy, $5 per year. Over a score of specialists describe industry's invasion of the new south. This number of the Annals is edited by Prof. William J. Carson of the University of Pennsylvania.

Science News Letter, February 28, 1931

Geophysics

RECUEIL D'ANALYSES CHIMIQUES DES ROCHES ERUPTIVES ET MÉTAMORPHIQUES RUSSES—Z. Némova—*Memoires du Comité Géologique,* 186 *(Moscow),* 361 p. This book consists wholly of tabulations of chemical analyses of eruptive and metamorphic rocks (there are 1676 separate examinations) so that with very little use of a dictionary even the geologist or geophysicist who cannot read Russian can still obtain the data he desires from them.

Science News Letter, February 28, 1931

Psychology

STAMMERING—Elsie Fogerty — *Dutton,* 64 p., 94 c. The author tells us that there is no single cause for this annoying difficulty and likewise no single cure. Each case demands individual study and treatment. Suggestions are given for making this analysis, and exercises which will help the young child.

Science News Letter, February 28, 1931

Chemistry

MODERN TEXTBOOK IN CHEMISTRY —J. Ellis Stannard—*Academic Book Co.,* 376 p., $1.32. A textbook of high school chemistry designed, with some success, to avoid the discouraging complexity of the average text.

Science News Letter, February 28, 1931

Philosophy

PERSONALITY AND SCIENCE—Lynn Harold Hough—*Harper,* 185 p., $2. The Ayer Lectures delivered at the Colgate-Rochester Divinity School.

Science News Letter, February 28, 1931

Chemistry

CHEMICAL PROGRESS IN THE SOUTH —Division of Chemistry and Chemical Technology, National Research Council—*Chemical Foundation,* 282 p., $1. Chemistry has played a major role in the making of the new industrial South. The leading specialists here give details of chemical problems and developments that cover a wide range. It is edited by Dr. J. E. Mills.

Science News Letter, February 28, 1931

Aviation

THE AIRPLANE—Frederick Bedell and Theodore E. Thompson—*Van Nostrand,* 371 p., $3.75. A college textbook and work of reference, parts of which have already proven their worth in previous editions.

Science News Letter, February 28, 1931

Ornithology

NOTES ON A COLLECTION OF BIRDS FROM ARIZONA AND NEW MEXICO—Harry C. Oberholser—*Cleveland Museum of Natural History,* 124 p. Of interest to students of bird classification and distribution.

Science News Letter, February 28, 1931

Literature-Writing

READINGS IN LANGUAGE AND LITERATURE—Collected by Vincil C. Coulter—*Ronald,* 443 p., $2.50. Selections intended for use in freshman English classes, but which should be helpful to anyone interested in writing. The sections on scientific thinking are from such widely different sources as John Dewey, Arthur Schopenhauer, Edwin E. Slosson, and John B. Watson.

Science News Letter, February 28, 1931

Botany

FOREST TREES OF MARYLAND—F. W. Besley—*Maryland State Department of Forestry,* 96 p. This booklet gives, in clear, concise form, an identifying description of each of the principal Maryland tree species. Each description is illustrated with a clear-cut line drawing of twig, leaf and fruit or flower.

Science News Letter, February 28, 1931

Psychology

PSYCHOPATHOLOGY AND POLITICS—Harold D. Lasswell—*University of Chicago Press,* 285 p., $3. Life histories are given which show how mental abnormalities may explain political convictions and the peculiar behavior of political agitators.

Science News Letter, February 28, 1931